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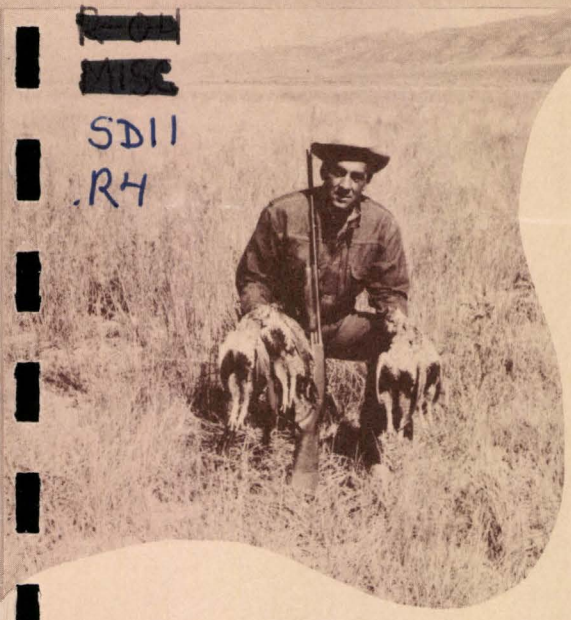
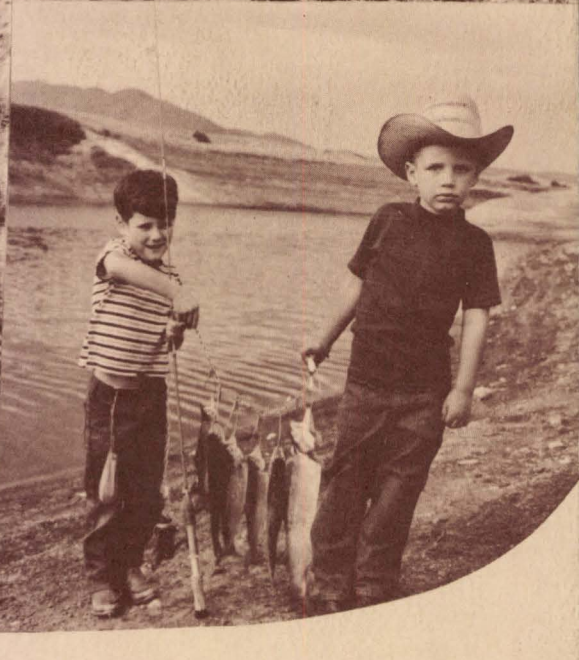


CURLEW NATIONAL GRASSLAND

DEVELOPMENT PLAN



caribou national forest

UNITED STATES DEPARTMENT OF AGRICULTURE

CURLEW NATIONAL GRASSLAND

DEVELOPMENT PLAN

Malad Ranger District Caribou National Forest Region 4

Plan Prepared By Wendell J Johnson District Ranger

Plan Approved By D. A. Schultz Forest Supervisor

Plan Approved By John K. Woodworth Director, Idaho Fish & Game Department

NOVEMBER 1970

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Condensation of the Purpose of the Project

The Curlew National Grassland of the Caribou National Forest, consisting of 47,600 acres, lies in the extreme southern portion of the State of Idaho. It is level country extending to gently rolling hills, predominantly covered with sagebrush and crested wheatgrass, land generally incapable of use as productive farm land. Administered by the Soil Conservation Service from 1938 to 1954 and by the Forest Service since 1954, the land has the practical potential of improving the economic asset of the County.

The Grassland currently supports wildlife populations in numbers 400 percent to 900 percent less than its capacity. All segments of the surrounding population contacted, from livestockmen to sportsmen to nature conservationists, enthusiastically support the proposed improvements.

The accompanying plans for comprehensive developments on the Curlew Grassland have been carefully and thoroughly prepared in the sincere belief that these improvements are needed and that they can be justified.

Introduction

The demand for recreation opportunities in the West is increasing even faster than the population. Extended leisure time, higher incomes, improved transportation, and the desire to utilize this new mobility--all these factors have brought pressure upon the wildlife recreation habitat presently available.

The closure of many acres of private lands (Photo 1) in the West has put even greater pressure on public lands; and on those private lands still open to the public, modern farming practices such as burning, spraying, and eradication of fenceline cover have constantly continued to reduce wildlife habitat. Public lands will be called upon to provide replaced habitat, if the wildlife resource is to reach its full potential of production.

Photo 1.

Closed private land adjacent to the Grassland. There will be no "No Trespassing" signs on the National Grasslands.

Before these demands of recent years, the Curlew Grassland carried a wide variety and abundance of wildlife. Older natives in the area tell of the excellent sage hen hunting in the Buist and Curlew Valleys. It was not uncommon to see sage grouse numbering into the hundreds. Today, some cover types have changed. Crested wheatgrass covers most of the area with only random stands

of browse and native grasses. Maintaining proper relationships and interspersion of food, water, and cover types would increase the wide variety and abundance of wildlife--from mule deer to songbirds.

As a part of the Caribou National Forest, the Grassland is a multiple-use area. Involved are livestock grazing, recreation, watershed protection, the production of crested wheatgrass seed, fisheries, and the aesthetic value associated with wildlife of all kinds. Ducks, geese, pheasants, grouse, and doves are included among the 85 different species of birds living on the Grassland. There are mule deer, coyotes, bobcats, cottontail and blacktail jackrabbits--and a few majestic golden eagles. Many species are comparatively few in number and under the present increased pressures are becoming fewer. Present conditions cannot offer the carrying capacities necessary to meet the needs created by mankind and his demands for outdoor recreation.

The rancher, the stockman, and others who see the outdoors as necessary to their livelihood face different needs. Their needs through multiple use of public lands must and can be met.

Prior to 1952, approximately 25,000 acres of the total area had been seeded to introduced grass species. Numerous water developments were installed and other grazing improvements established to maintain the forage resources, and this aided in stabilizing the agricultural industry in the area.

Recently an intensive investigation has been made of the Curlew Grassland in regards to its wildlife potential, and a plan has been devised to provide basic information and guidelines for a development program. This plan is based on an inventory completed in the fall of 1968, and indicates that the wildlife habitat can be improved in a satisfactory working relationship with livestock grazing and other necessary commitments. The potential is excellent from every standpoint.

The location of the Curlew Grassland makes it ideal for access by the people of the Intermountain area. It is immediately adjacent to the heavily populated Wasatch Front in Utah and to the Pocatello and Twin Falls, Idaho, metropolitan areas. Tourists would find the area an additional attraction, and an easy drive from the Bear River Migratory Bird Refuge and the newly established Golden Spike National Monument, both a few miles to the south. All are on the main access routes north to Idaho and Wyoming.

The local economy in the area is presently in a state of overall decline; nearby businesses and school districts are experiencing the effect of a steady decline in population. Increased recreation opportunities such as hunting, fishing. and non-consumptive uses of wildlife would stimulate business.

Public presentations of the proposed project have been made to such groups as the Technical Action Panel, local Cattlemen's Associations, Oneida County Commissioners, RC&D and sportsman's groups. All have enthusiastically supported the plan.

Wildlife is important to the national economy, and the Curlew Grassland resource will do its part on a local basis. This area holds the potential to provide, at a modest expenditure, a substantial public service. The Curlew National Grassland is producing a good supply of beef each year, however, there are many improvements that should be done to increase beef production. The improvements needed and the dollars required to implement the range improvements are included in this plan as an attachment. The following detailed report offers the plans to realize that potential.

The Inventory

The wildlife inventory and evaluation of the Curlew National Grassland were accomplished during a three-year period in accordance with an approved plan. The inventory consisted of locating, identifying and classifying the wildlife species and their habitat on the 47,600 acres. The study was designed to determine the wildlife requirements and the limiting factors on the wildlife populations. Plans were developed for areas where wildlife species were found and where known habitat requirements were lacking.

Bird nesting surveys and brood counts were made to identify nesting and brooding habitat. Emphasis was placed on identifying upland game habitat, mainly pheasants, sage grouse, and sharptail

grouse. An intensive vegetal analysis using a canopy coverage method was done at each sighting location for sage grouse and sharptail grouse. At each sighting location, the plant density, height, and composition were recorded. All wildlife species and areas of use were also recorded. Sex ratio counts of pheasants were made during the winter to determine the population composition.

Range analysis was completed and used to determine the different habitat types by acres. The habitat types were analyzed on the basis of wildlife use suitability. The results of the range analysis data was also used to develop an overall range improvement plan.

The Grassland Resource

The National Forest system land administered by the Caribou National Forest consists of 47,600 acres of which 47,440 acres are in Oneida County, Idaho, and 160 acres in Power County, Idaho. The lands within the Curlew National Grassland were acquired from individuals under Title III of the Bankhead-Jones Farm Tenant Act. These lands were incapable of yielding the owners a stable livelihood and in many cases were badly eroded. The Soil Conservation Service administered the lands from 1938 to 1954 and carried out an intensive rehabilitation program. About 30,000 acres have been seeded to crested wheatgrass. The Forest Service has administered the lands since 1954.

The topography is level to gently rolling hills. The soil is of a calcarious nature. A calcite hardpan exists at a depth of 12 to 14 inches on most of the south unit. Large expanses of crested wheatgrass and sagebrush is the predominant vegetal cover. There are six classified types of habitat within the Curlew National Grassland. (Table I)

TABLE I

	1	1s	1f	2w	2d	3	4	5	6p	6l	
Type	Crested Wheat-grass	Crested Wheatgrass & Sagebrush	Crested Wheatgrass & 10% Forbs	Wet Meadows	Dry Meadows	Sage-brush	Browse-Shrub	Open Water	Perennial Streams	Inter-mittent Streams	Total Acres
Acres	12,979	13,807	5,775	109	113	6,822	7,726	273	17 miles	5½ miles	47,600

Key for Habitat Analysis:

Type 1 : Crested wheatgrass
Type 1s: Crested wheatgrass mixed with sagebrush
Type 1f: Crested wheatgrass with or without browse, but having at least 10% forbs. (In order to be of value for wildlife, there must be at least 10% forbs in the plant community.)
Type 2w: Wet Meadow
Type 2d: Dry Meadow
Type 3 : Sagebrush
Type 4 : Browse-shrub (Species such as bitterbrush, sagebrush, rabbitbrush, serviceberry)
Type 5 : Open Water
Type 6p: Perennial streams
Type 6l: Intermittent streams

A summary of the range analysis is presented in Table A-1 (Appendix).

Following are illustrations and descriptions of the habitat types of the Curlew National Grassland:

Photo 2.

Hurd Field.

Type 1. Crested Wheatgrass

Primary Wildlife Users: Hungarian partridge, sage grouse, pheasant.

Food Value: Poor--little value for wildlife without other succulent vegetation.

Cover Value: Poor--no winter habitat without interspersion of shrubs and trees.

Proposed Treatment: Selective plowing and planting trees, shrubs, and succulent vegetation will provide the desirable food and cover for wildlife.

Acres of Type: 12,979

Photo 3.

South 13 Field

Type 1s. Crested Wheatgrass and Sagebrush

Primary Users: Sage grouse, sharptail grouse, Hungarian partridge, pheasant, mourning dove, cottontail rabbit.

Food Value: Fair--minor value to wildlife without succulent vegetation, weeds, and grains.

Cover Value: Good--Upland game are dependent upon the proper density and height of sagebrush to provide the necessary hiding and resting places in this type.

Proposed Treatment: Plow and plant irregular strips to encourage the growth of desirable wildlife plant species to provide the necessary food and cover for wildlife.

Acres of Type: 13,807

Photo 4.

Sharptail grouse nest in the Hess-Haws Field.

Type 1f. Crested Wheatgrass with 10% Forbs

Primary Users: Sage grouse, sharptail grouse, Hungarian partridge, pheasants, mourning doves, cottontail rabbit.

Food Value: Excellent--during the spring, summer, and fall. The forbs in this type provide the desirable food for wildlife.

Cover Value: Good--upland game are dependent upon grass and forb type for nesting habitat.

Proposed Treatment: Selectively plowing and planting succulent vegetation.

Acres of Type: 5,775

Photo 5.

Wet meadow in the Vanderhoff Field.

Type 2w. Wet Meadow

Primary Users: Curlew, ducks, geese, sage grouse, Hungarian partridge, coyote, mourning dove, mule deer and bobcat.

Food Value: Excellent--this type provides the necessary food for wildlife.

Cover Value: Good--provides suitable resting, nesting and protection areas for wildlife.

Proposed Treatment: Installation of wells and control structures will improve this type.

Acres of Type: 109

Photo 6.

Dry meadow at the north end of Stone Reservoir.

Type 2d. Dry Meadow

Primary Users: Pheasant, Hungarian partridge, mourning dove.

Food Value: Poor--no succulent plants available for upland game.

Cover Value: Poor--no protection for upland game.

Proposed Treatment: Protecting this type by controlling livestock grazing will provide excellent native food and cover for upland game.

Acres of Type: 113

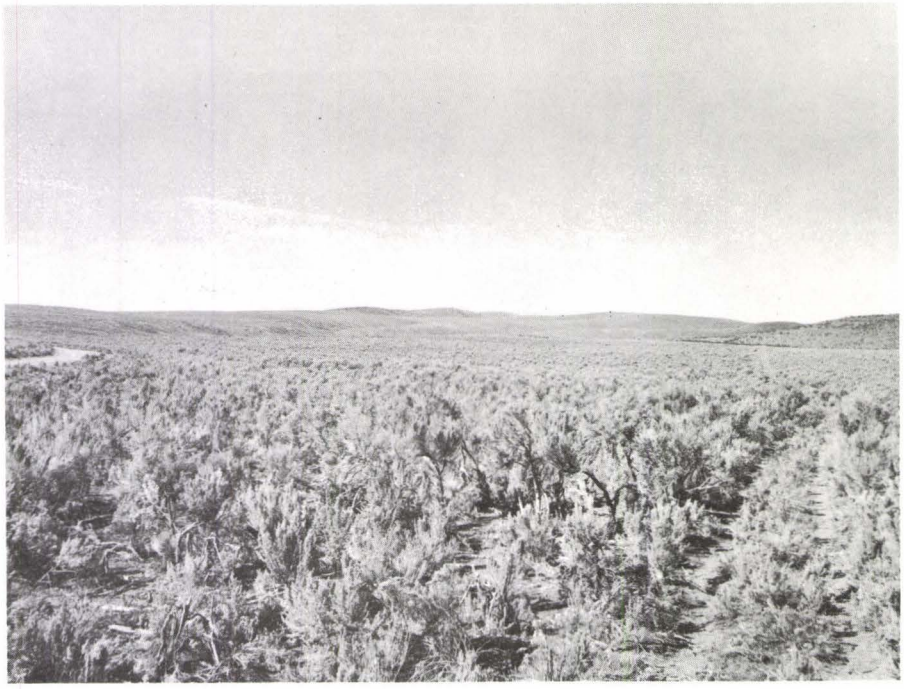


Photo 7.

Stand of sagebrush in the Huffman Field.

Type 3. Sagebrush

Primary Users: Sage grouse, rabbit, coyote, bobcat, mule deer.

Food Value: Poor--plants are too tall and decadent to be suitable for wildlife.

Cover Value: Fair--provides fall and winter habitat for rabbits and deer.

Proposed Treatment: Chaining will be done to maintain the proper plant density and height.

Acres of Type: 6,822

Photo 8.

Sagebrush and Rabbit brush in the West 13 Field.

Type 4. Browse-Shrub

Primary Users: Sage grouse, sharptail grouse, Hungarian partridge, pheasant, mourning dove, mule deer, cottontail rabbit, bobcat, coyote.

Food Value: Good--food for wildlife throughout the critical winter months.

Cover Value: Excellent--cover for wildlife during summer and critical winter months.

Proposed Treatment: Plowing and planting trees and shrubs will provide additional winter habitat and suitable nesting areas.

Acres of Type: 7726

Photo 9.

Stone Reservoir.

Type 5. Open Water

Primary Users: Trout, bass, crappie, waterfowl.

Food Value: Fair--the bare exposed banks provide little habitat for insects and other animals essential for wildlife food.

Cover Value: Fair--very little shade is present for fish and the exposed banks make unsuitable habitat for game birds taking their broods to water.

Proposed Treatment: Drill wells to provide additional ponds and control livestock use.

Acres of Type: 273

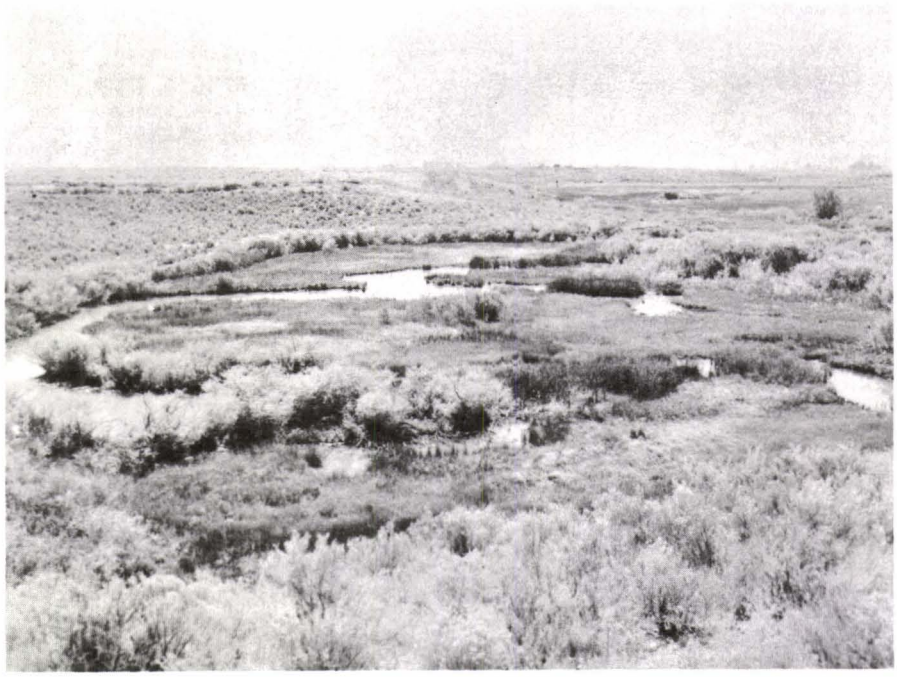


Photo 10.

Stream below Stone Reservoir.

Type 6p. Perennial Streams

Primary Users: Sage grouse, sharptail grouse, Hungarian partridge, pheasant, ducks, mourning doves, mule deer, coyote, bobcat, cottontail rabbit, muskrat, and fish.

Food Value: Excellent--provides ample water and food for wildlife during spring, summer, fall, and winter months.

Cover Value: Good--provides suitable resting, nesting, and protection areas for wildlife.

Proposed Treatment: Stabilize stream banks and maintain water flow.

Miles of Type: 17

Photo 11.

Stream in the Salyer Field

Type 6I. Intermittent Streams

Primary Users: Sage grouse, rabbits, coyote, bobcat, mule deer, Hungarian partridge, mourning dove, pheasant and duck.

Food Value: Good--ample supply of water during spring and early summer.

Cover Value: Good--ample supply of cover during spring and early summer.

Proposed Treatment: Provide fresh, quality water and sufficient cover through protection.

Miles of Type: 5.5

The Wildlife Resource

Wildlife Species Composition: Knowledge of the species composition is essential in a development program because of the variability in habitat requirements of each species. Field observations have shown 85 different species of birds to be common on the Grassland. The major game birds are ducks, geese, pheasants, sage grouse, sharp-tail grouse, partridge, and mourning doves. All of these species are hunted on the Grassland and provide many hours of recreation. The mule deer is the only big game animal found. Portions of three of Idaho's deer herd units are included within the Grassland. The coyote, bobcat, and badger are commonly seen and are important to the total wildlife resource. The sagebrush areas have always supported a heavy population of blacktail jackrabbits. Various species of rodents and reptiles inhabit the area. Stone Reservoir provides some excellent fishing for bass, crappie, and trout. (See Appendix for checklist of Wildlife species)

The following is an estimated population figure for the major species of wildlife. Figures are based on a three-year inventory made during all four seasons of the year.

Table II

I. Resident Species

Species	Estimated Population			
	Spring	Summer	Fall	Winter
Pheasant	300	1000	700	300
Hungarian Partridge	200	600	400	200
Sharptail Grouse	75	150	100	50
Sage Grouse	75	100	200	500
Chukar Partridge	40	160	40	20
Golden Eagle	7	7	7	7
Cottontail Rabbit	300	600	600	300
Coyote	30	70	70	30
Bobcat	25	25	25	25
Mule Deer	300	25	300	75
Blacktail Jackrabbit	1200	2000	2000	1000

II. Migratory Species	Spring	Summer	Fall	Winter
Ducks	6000	500	10,000	1000
Geese	--	--	2,000	50
Mourning Doves	2500	5000	4,000	--

Currently the Curlew National Grassland is much less than optimum habitat for nearly all the wildlife species listed. As Table II indicates, the lack of winter habitat is one of the limiting factors for all the upland game species except the sage grouse. For the sage grouse, the limiting factor is a lack of suitable nesting, brooding, and summering habitat.

Photo 12.

Lack of winter cover limits wildlife numbers.

Sage grouse, sharptail grouse, partridge, pheasants, and waterfowl that occupy areas adjacent to the Grassland are dependent on the Grassland habitat for providing migration routes, wintering areas, feeding and resting places. This explains the increase and decrease of the various species during the four seasons of the year.

Habitat Requirements

Studies have shown the relationship and interspersion of food and cover types and the proportion of each to be limiting factors on the wildlife population. A rather definite pattern of water,

food, and cover types must exist before land can produce the optimum numbers of wildlife. The greater the distance any one necessary plant type is from all the others, the larger the range and the smaller the number of wildlife the area will support. The most desirable situation is one in which all habitat requirements are met within a relatively small area. No matter how productive an individual plant type may be, wildlife will not use it to the fullest extent unless it is properly located with respect to other needed types. For example, a sage grouse strutting ground must be open in aspect so the cocks can make themselves visible to the hens. There must be a suitable nesting area located near the strutting ground. To be suitable for hens to nest, the area has to have sagebrush of a medium height to provide nesting shelter and food. Therefore, there must be an open area surrounded by sagebrush in order for sage grouse to mate and nest.

Good insect populations are essential for sage grouse broods and contribute to the food chain of many species of birds and animals. When little chicks hatch, they depend upon a rich supply of insects, especially ants. These are in turn produced by a well balanced community of shrubs, grasses, and forbs. Ground cover plants of grasses and forbs are extremely important to chicks. They are not very mobile during their first weeks of life and their reaction to predators is to freeze. Therefore, they need good ground cover to keep them hidden.

As they gain in size and mobility, their diet shifts to the new buds of leaves and flowers where the most tender and nutritious food is located. Since grass plants have the growing point concealed in the basal foliage, the tips become tough and unacceptable as food for sage grouse. Forb plants have the growing points on the tips of branches where they are available. These buds continue to develop for a longer period of time than do grasses. The dense stands of crested wheatgrass can be broken up by planting forbs and the land can be made more productive for sage grouse, pheasants, and other wildlife.

Every winter approximately 300 sage grouse return to the South Huffman Field. Studies show that a sagebrush stand with 2500 plants/acre, 8" - 24" in height is the optimum winter habitat. (Ref. to Photo 13) However, the sagebrush is becoming taller and more dense every year. In order to maintain optimum winter habitat for sage grouse, the sagebrush will have to be treated periodically. It is the intent of this program to improve the wildlife habitat by recognizing the limiting factors on wildlife populations and then correcting them.

Photo 13.

Excellent sage grouse winter habitat.

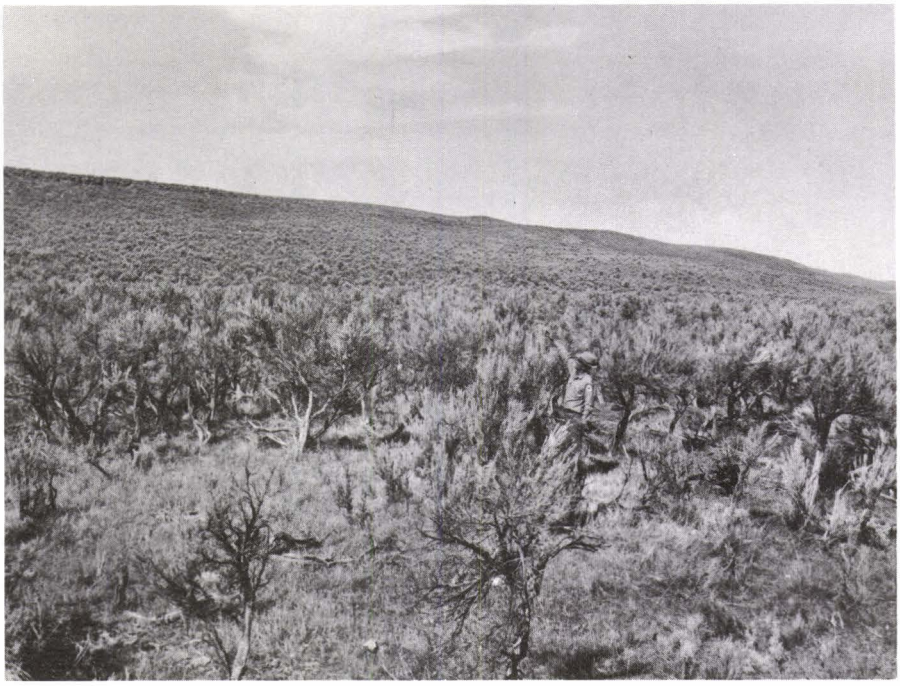


Photo 14.

Dense, tall sagebrush is unsuitable habitat for most wildlife.

Improving the Grassland Habitat

Based on the inventory and studies, plans were developed for areas where wildlife species are presently found and known habitat requirements are lacking. The development of water resources and the planting of trees and shrubs have been planned. Where possible, vegetation already present will be improved because, campared to planting, its success is more certain, quicker, and less expensive. This can be done by fencing and protecting critical wildlife areas from livestock grazing during certain seasons of the year. All types of development described in this plan have been accomplished during recent years. They have been primarily demonstrations because of financial limitations, but they provide the experience and basic knowledge for an accelerated program. The various types of developments and techniques are discussed as follows:

Fencing:

Photo 15.

Fences provide the needed protection for trees and shrubs to become established.

Strategically located fencing will provide the needed total control of the area. New plantings will be protected during the crucial seeding periods, and later in plant maturity control of grazing will insure maintenance of vegetation to provide management necessary for plant survival and wildlife habitat.

Fence lines will be paralleled by a double row of trees, offering optimum visual attraction and functional advantage. Trees

in the outer row will be located so as to obscure the fence. Cattle guards and gates will be conveniently located.

Vegetative Plantings:

Photo 16.

Russian olive trees in Vanderhoff Field.

The planting of trees and shrubs will help provide the necessary food and cover for the pheasant, partridge, and sharptail grouse throughout the critical winter months. (Photo 16 and 17) Besides providing winter habitat, the trees and shrubs will furnish succulent

leaves and buds especially in the late summer and early fall when most growth is dry. Sage grouse and sharptail grouse are vegetarians and are highly dependent on succulent vegetation for good reproduction. Herbaceous species have been chosen that are suited to both the climate and the soil.

Vegetative planting will provide food and cover for wildlife. These plantings will provide nesting and resting areas that will create additional habitat for many species.

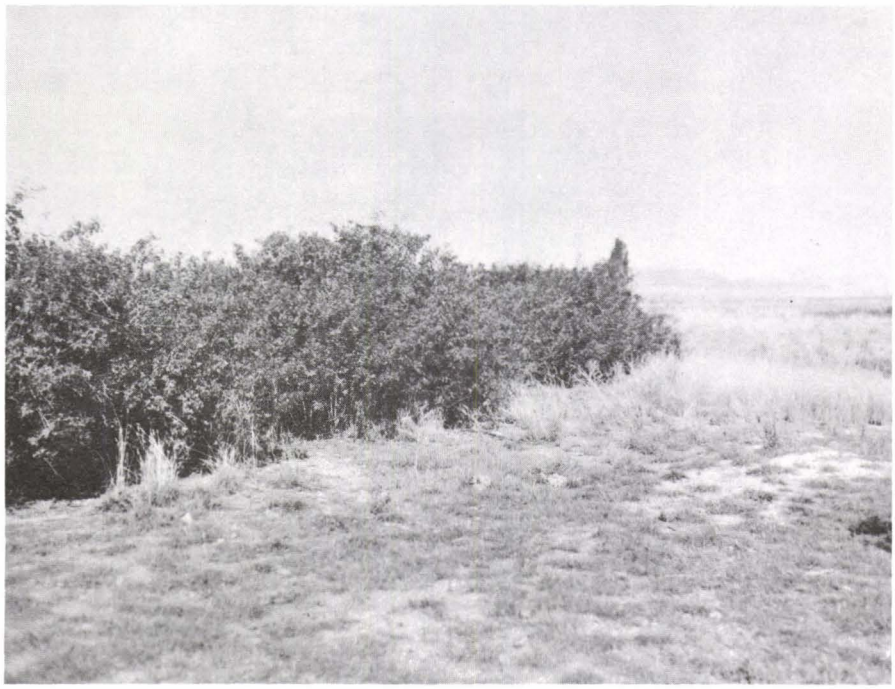


Photo 17.

Wild rosebushes.

Presently there are thousands of acres with a monotypic crested

wheatgrass cover. Plowing and seeding plants beneficial for wildlife will provide food for grouse, pheasants, partridge, doves, rabbits, deer and livestock. By plowing and ripping 1310 acres, an additional 21,431 acres will be made suitable for wildlife use.

Prescribed burning or chaining: Surveys and studies in Curlew Valley have shown that sharptail grouse inhabit areas with good stands of native forbs and grasses. There are many acres that can be burned or chained and converted to suitable habitat for sharptail grouse. This treatment will materially improve the habitat for other species such as partridge, deer, and livestock. These treatments are economical methods to convert dense, tall, decadent sagebrush stands to more productive and manageable types. (Photo 18)

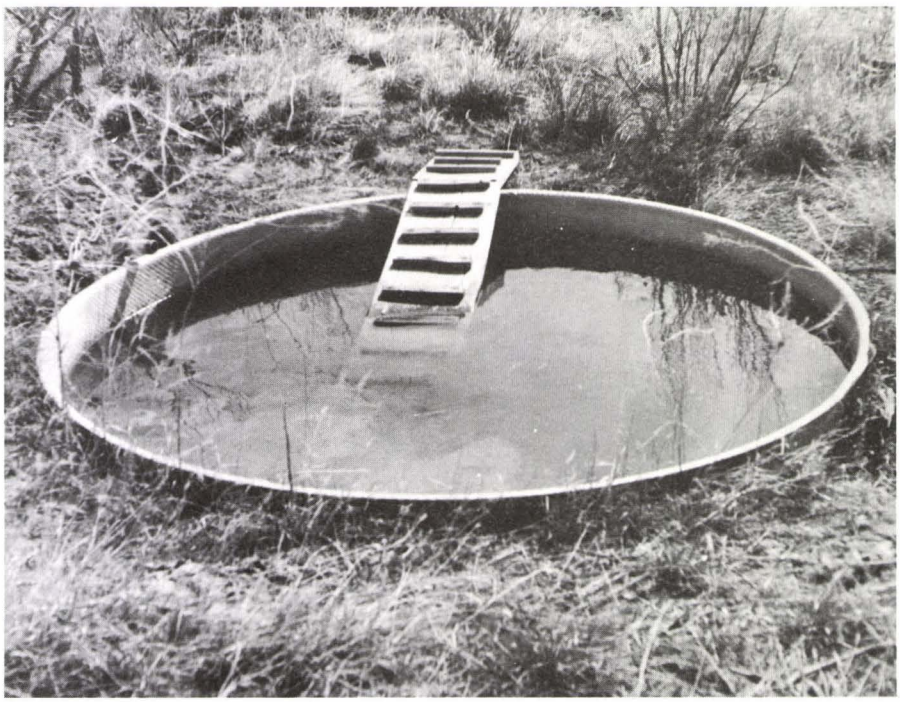
Photo 18.

Chaining of dense, tall sagebrush unsuitable for wildlife and livestock.

Chemical and Mechanical Treatment of Sagebrush: Herbicides may be used along with mechanical treatment to open up dense stands of tall, decadent sagebrush. Dense stands of sagebrush become unattractive to most wildlife.

Water Development: The Grassland receives 11-13 inches of moisture annually. Most of this is in the form of rain and snow during the late fall, winter, and early spring, and most of the moisture is lost by the heat of summer months. The lack of water is one of the limiting factors on wildlife populations.

One of the reasons for the drastic decline in sage grouse populations is the drying up of meadows and the loss of sage grouse brooding and summering habitat. By the proper location and construction of wells, ditches and ponds, the grassland habitat can be better utilized for wildlife and livestock. Existing limited water supplies will be more thoroughly utilized and substantially increased.



Photos 19 and 20.

Water development for wildlife and livestock.

PROJECT BENEFITS

1. Game Species

If the developments are provided as planned, what response by wildlife can be expected? How many additional pheasants, sage grouse, partridge, and other game species can the Curlew National Grassland accommodate as a result of habitat improvement? Answers can be estimated by applying the present population numbers on the inhabitated acres of suitable habitat and then projecting the populations on to additional acres of developed habitat.

The expected intensity of use resulting from the proposed Grassland development is indicated below:

SPECIES	PRESENT ANNUAL USE PER SUITABLE ACRE	ACRES TO BE DEVELOPED	% INCREASE AFTER HABITAT IMPROVEMENT
Ring-necked Pheasant	1 bird per 4 acres	28,000 acres	700% or 7,000 more pheasants
Hungarian Partridge	1 bird per acre	4,200 acres	700% or 4,200 more partridge
Sage Grouse	1 bird per 25 acres	16,000 acres	640% or 640 more sage grouse
Sharptail Grouse	1 bird per 2 acres	2,000 acres	900% or 900 more sharptail grouse
Mourning Dove	5 birds per acre	5,000 acres	500% or 25,000 more doves
Cottontail Rabbit	3 rabbits per acre	800 acres	400% or 2,400 more cottontails
Bass	100 bass per acre	37 acres	370% or 3,700 more bass

In addition to the above response, the improvements will accommodate many additional wildlife species. The magnitude of this response is difficult to predict, but a straight line extrapolation based on a present species occupancy per suitable acre is the method used. Comparative project experience indicates that the calculated response is a conservative one.

Migratory species such as waterfowl will vary with conditions in other areas. However, due to the proposed development and vegetative plantings, there will be an increase in the number of days waterfowl remain in the area.

2. Other Wildlife

In addition to the primary objective of increasing upland game and fish populations, there are other benefits to be derived from the development of the grassland. Additional forage produced by the tree plantings will improve the habitat conditions for several species of songbirds, flycatchers, hawks, owls, and nearly all bird species of the fields and plains.

The Grassland is a concentration area for the Horned Lark. Every winter thousands of these little birds are dependent upon the weeds that protrude above the snow. Sunflower, wild lettuce, teasel, and Russian thistle will be managed on these wintering sites of the Horned Lark.

The Long-billed Curlew, once a common resident on the Grassland, may return to the developed meadows and native stands of grass to feed and nest. A native grassland associated with an acquatic

environment is an essential habitat for this bird.

Not one species of bird, mammal, reptile, or fish will be adversely affected by the proposed development. The Curlew National Grassland has the potential to be developed and managed for many species of wildlife. (Table A-II Appendix)

COMPARISON OF SOD AND SHRUB FENCE ROWS FOR USEFUL AND HARMFUL WILDLIFE

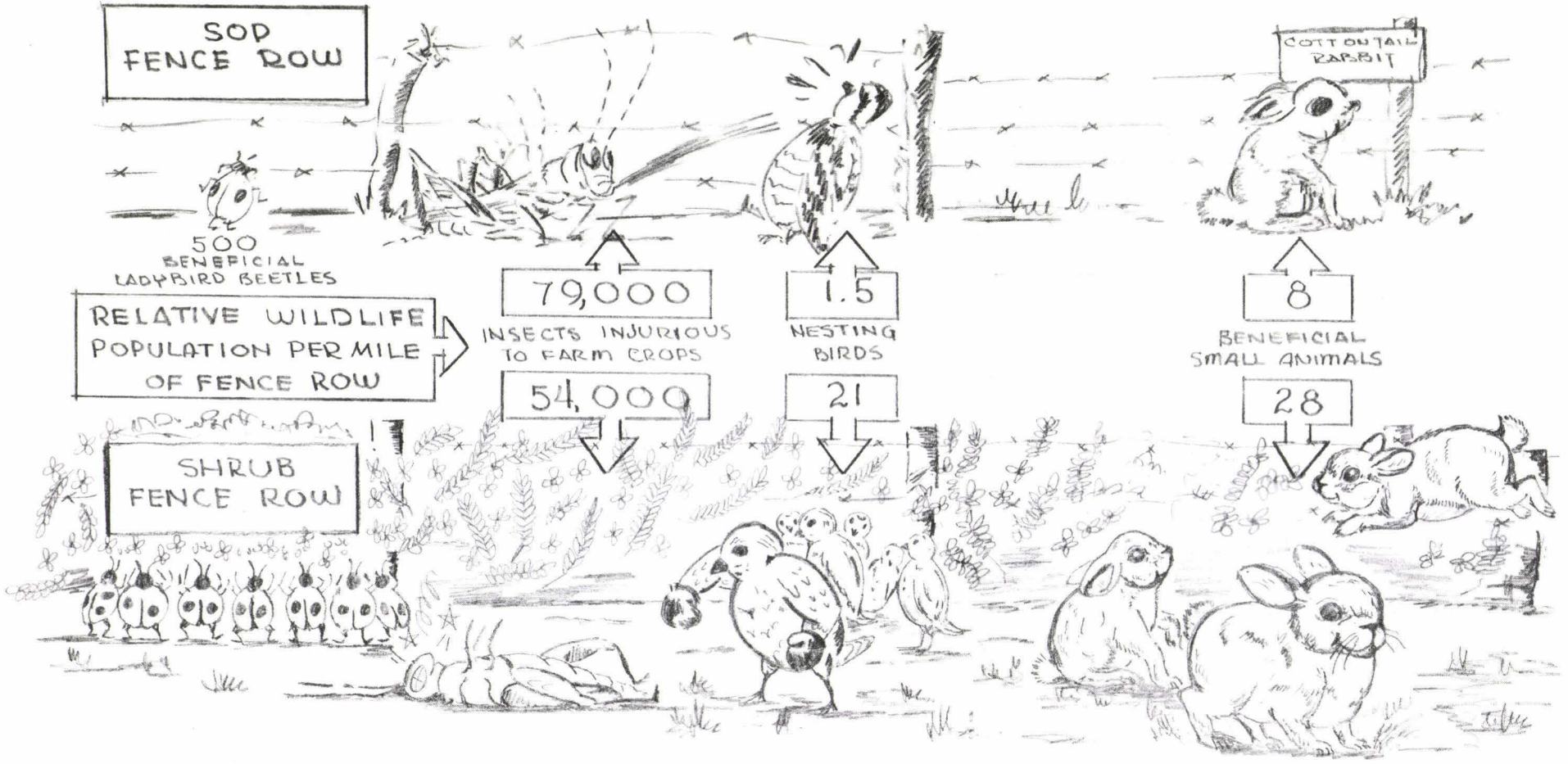


Photo 21.

Fish from Stone Reservoir.

3. Fishing

The use of the existing Stone Reservoir will be increased by two access roads and by improved camping areas. In addition the creation of a 37-acre pond will provide a bass fishery. The areas around these waters will, because of the increased vegetation and scenic surroundings, become especially attractive to campers and vacationers.

Photo 22.

Enjoying campground and fishing at Stone Reservoir.

4. Flood Control

Impoundments and the stabilization of gulleys will retain water during wet periods for use in dry periods and thus prevent immediate discharge of spring precipitation and runoff. Windbreak plantings will utilize and slow overland flow of water, thus spreading water and reducing soil erosion.

5. Fire Control

The development of wells, impoundments, and perennial streams will reduce the fire risk during the dry season. Different vegetative types reduce rate of fire spread, and windbreaks will be green and

will slow fire movement. Improved water utilization overall will increase green vegetation to minimize fire danger.

6. Livestock Grazing

Livestock grazing will be compatible with the wildlife in this area. Wildlife requirements are considered in the grazing rotation, and the grazing schedule will be adjusted to provide the optimum benefits to both cattle and wildlife. By adjusting the rotation, protection can be given to nesting and breeding areas, and after the nesting season the vegetation can be utilized by livestock. The improvements will provide water, shade and forage, and distribution of livestock will be more uniform. As soon as the plantings are established, the enclosed areas will be grazed on a planned rotation system. Livestock tramp the seeds into the ground and serve as seed planters. Cattle will utilize the planted shrubs, thus the shrubs will produce more shoots and make plants more available to wildlife. The shrubs also produce food for livestock.

Photo 23.

Livestock tramp the seeds into the ground and serve as seed planters

Sage grouse must have open areas, called booming grounds, necessary for the strutting ceremonies during mating. Cattle can be used to open the thick stands of vegetation to provide these open areas.

Water presently is hauled to cattle on 2800 acres. Water hauling is expensive, amounting to approximately $2.10 per AUM. This is a direct cost to the livestockman which will be eliminated when wells are completed. (Photos 24 and 25)

Photo 24.

Water Hauling costs cattle permittees approximately $2.10 per AUM.

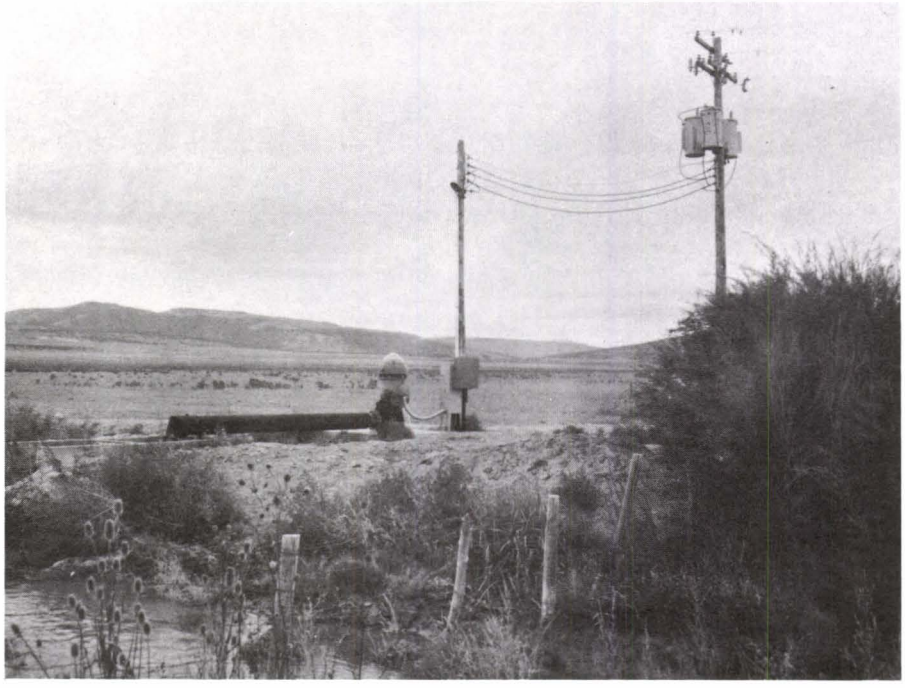


Photo 25.

Wells will eliminate water hauled for livestock.

7. Agriculture

Part of the planting will border adjoining crop lands. The valley is open with moderate to heavy winds occurring nearly every day of the year. The majority of the agriculture is dry farming; therefore, many acres are left in summer fallow, and summer fallow fields are susceptible to wind and water erosion. Grassland planting will serve as wind breaks to reduce wind speeds and reduce soil movement on private lands.

Drifting snow is a major problem during winter months, and the wind breaks will help control the drifting snow.

Insects are important to agriculture, but the present sparse windswept fields support little insect life. Windbreak planting will provide good habitat for beneficial insects.

8. Aesthetic

The Curlew National Grassland is located in a semi-arid area where the casual traveler sees little to break the monotony of the vast monotype areas of brush and grass. The proposed plantings would materially improve the scenery and enhance the outdoor experience for the sportsman as well as the tourist or traveler.

9. Recreation

The project will greatly increase the wildlife population, thus recreation opportunities will be expanded in hunting, fishing, camping, picnicking, photography, bird watching, and just general enjoyment. Hunting use will probably be the most immediately noticeable return. (Photos 26 and 27)

The development of public recreation areas is becoming more and more important because increasing areas of private lands are posted, thus allowing only a select few to hunt. In addition to actual lands posted, many landowners in other areas have control of access roads to public domain, and exorbitant trespass fees are charged to use these roads.

Americans have rediscovered the enjoyment of outdoor camping--as the great numbers of trailers, truck campers, and tent trailers on the nation's highways bear evidence. (Photo 28) It is conservatively estimated that camping use of the Grassland will increase from the present 10,900 man days to 32,480 man days.

Photo 26.

Sage Grouse.

Photo 27.

Mallard Ducks

Many hours of high quality recreation are spent on the Curlew National Grassland. The recreational hours and values can be increased many times.

Photo 28.

Typical weekend at Stone Reservoir.

10. Economic Benefits to County

Oneida County, Idaho, and Box Elder County, Utah, are struggling to improve their economy. Both counties have been established as Resource, Conservation and Development areas, a fact which attests to the strained economy. Most of the young people are forced to move to the crowded cities to seek employment. In 1965, the Oneida County Rural Areas Development Committee published figures showing a decline in rural population of 51% from 1940 to 1960.

This project will influence local economy in many ways. The improvements will be built by local people in most cases, thus the money will be reflected in local income. Aside from the money that will be brought into the County initially, the maintenance, supervision and follow-up work will provide $2\frac{1}{2}$ man years employment. Materials and supplies will be needed, and many of these items will be purchased locally. Increased tourist trade will materially benefit local businesses.

The habitat improvement will favorably influence areas many times the size of the Grassland. Wildlife populations will increase many times not only on the Grassland but also very naturally on surrounding areas. Private land owners will note increased hunting activity which can be turned to the advantage of the community.

Many of the improvements proposed will benefit livestock and the benefits derived will help the livestock economy in Curlew Valley.

Many private land owners will make improvements on their own lands following the pattern set up in this project. Overall ramifications of the Grassland improvements will have far reaching effects.

NEEDED WILDLIFE DEVELOPMENTS

1.	Fence	73 Miles
2.	Plow and Plant	1,414 Acres
3.	Ditch	35¼ Miles
4.	Chisel Hard Pan	72 Miles
5.	Strip Plow and Seed	1,310 Acres
6.	Public Access Roads and Parking	3¼ Miles
7.	Develop Wildlife Ponds	10 Ponds
8.	Guzzlers	12 Guzzlers
9.	Drill Wells and Provide Power Lines	2 Wells
10.	Mechanical Treatment (Brush Beating Railing, Dixie Harrow, Chaining)	1,000 Acres
11.	Prescribed Burning or Chaining	2,000 Acres
12.	Cattle Guards	10 Guards
13.	Brush Piles	10 Piles
14.	Provide Sanitation Facilities and Recreation Facilities at Stone Reservoir	
15.	Large Information Sign	5 Signs
16.	Small Information Sign	10 Signs
17.	Access Trail	2 Miles
18.	Reconstruct Sweeten Pond	1 Pond

UNIT COSTS FOR WILDLIFE DEVELOPMENT

Development		Cost/Unit
1.	Fence	$ 1,150.00/Mile
2.	Plow and Plant (trees-shrub-grain)	14.00/Acre
3.	Ditching	25.00/Mile
4.	Chisel Hard Pan	20.00/Mile
5.	Strip Plow and Seed	10.00/Acre
6.	Public Access Roads and Parking Areas	3,923.00/Mile
7.	Wildlife Ponds	440.00 Each
8.	Guzzlers	500.00 Each
9.	Drill Wells and Provide Power Lines	
	(a) North Carter Well	23,000.00 Each
	(b) West Jacobsen	10,000.00 Each
10.	Mechanical Treatment (Brush Beating, Railing, Dixie Harrow, or Chaining)	8.00/Acre
11.	Prescribed Burning or Chaining and Seeding	10.00/Acre
12.	Cattle Guards	700.00 Each
13.	Brush Piles	100.00 Each
14.	Expand Recreation Facilities at Stone Reservoir & Provide Sanitation Facilities	25,000.00 Each
15.	Large Information Signs	1,000.00 Each
16.	Small Information Signs	200.00 Each
17.	Trail Construction	1,000.00/Mile
18.	Reconstruct Sweeten Pond	18,000.00

PROJECT COSTS

1.	Fence	73 Miles	$ 83,950.00
2.	Plow and Plant	1,414 Acres	19,796.00
3.	Ditch	35¼ Miles	866.00
4.	Chisel Hard Pan	72 Miles	1,440.00
5.	Strip Plow and Seed	1,310 Acres	13,100.00
6.	Public Access Roads & Parking	3¼ Miles	12,750.00
7.	Develop Wildlife Ponds	10 Ponds	4,400.00
8.	Guzzlers	12 Guzzlers	6,000.00
9.	Drill Well & Provide Power Line	2 Wells	33,000.00
10.	Mechanical Treatment (Brush beating, Railing, Dixie Harrow, Chaining)	1,000 Acres	8,000.00
11.	Prescribed Burning or Chaining	2,000 Acres	20,000.00
12.	Provide Cattle Guards	10 Guards	7,000.00
13.	Brush Piles	10 Piles	1,000.00
14.	Expand Recreation Facilities at Stone Reservoir and Provide Sanitation		25,000.00
15.	Large Information Sign	5 Signs	5,000.00
16.	Small Information Sign	10 Signs	2,000.00
17.	Access Trail	2 Miles	2,000.00
18.	Reconstruct Sweeten Pond		18,000.00
	Project Economic Costs		263,302.00
	Overhead Assessment		52,660.00
	Total Fund Requirement		$ 315,962.00

WILDLIFE BENEFITS BY TYPE AND AMOUNT

H.D. = Hunter Day
F.D. = Fisherman Day
V.D. = Visitor Day
A.U.M. = Animal Unit Month

TYPE	PHYSICAL UNIT INCREASE	DAYS OF USE	ANNUAL NET BENEFIT
Upland Game Hunting			
Pheasants	7,000	3,500 H.D.	$17,500.00
Sage Grouse	600	600 H.D.	3,600.00
Sharptail Grouse	1,300	1,300 H.D.	7,800.00
Hungarian Partridge	4,200	1,000 H.D.	5,000.00
Mourning Doves	20,000	4,000 H.D.	12,000.00
Cottontail Rabbits	1,800	600 H.D.	1,800.00
Waterfowl	165	180*	900.00
		SUBTOTAL	$48,600.00

*Days use is mostly due to increased access and lengthened hunting period due to improved habitat which would hold waterfowl in area longer.

Fishing			
Trout		200*F.D.	$ 800.00
Bass	3,700	2,000 F.D.	4,000.00
		SUBTOTAL	$ 4,800.00

*Days use is mostly due to increased public access

General Recreation		
Camping	3,000 V.D.	$ 4,500.00
Bird Watching & Photography	200 V.D.	200.00
Picnicking	4,000 V.D.	2,000.00
Public Tours	500 V.D.	250.00
General Tourism	1,000 V.D.	500.00
	SUBTOTAL	$ 7,450.00

Livestock	
Use - 1300 A.U.M. @ $4.53	$-5,889.00*
Lowered water cost - Eliminating hauling of water	2,373.00
Cost saving for eliminating water hauling after fencing cattle out of travel influence zone.	3,622.00
SUBTOTAL	$ 106.00

*Reduced livestock use will be less after the fence rows are established because livestock use will periodically be made in these areas.

TOTAL ANNUAL BENEFITS	$60,956.00

Present worth of benefits are figured @ 10 percent interest and project life of 30 years. Benefits are expected for 28 years or each year after two years establishment period.

$$9.426 \times 60,956 = 574,571 \times .826 = \$474,595$$

Benefit - Cost Analysis

Benefits -	
Present worth of expected benefits	$474,595.00
Costs -	
Initial Development Costs	263,302.00
Present worth on Annual Costs for 28 years 9.307 x 23,230 =	216,202.00
TOTAL COSTS (Present Worth)	$479,504.00

Benefit - Cost Ration = .989

$$\text{Rate of Return} = \frac{\text{Annual Benefits - Annual Costs}}{\text{Initial Investment}}$$

$$\frac{60,956 - 23,230}{263,302} = \frac{37,726}{263,302} = 14.3 \text{ Percent Return}$$

This analysis is on the basis of primary benefits only. While it is evident there will be benefits felt by other segments of the economy, secondary benefits are not included in this analysis. Because of the lack of tourist facilities in the immediate area, these secondary benefits would be dispersed through Northern Utah and Southern Idaho.

Each segment of the plan which could logically be separated was analyzed. It was found that each portion was justified on an incremental basis. It was also determined that each portion of the project represented the least costly means of achieving the

desired results. Senate Document 97 was used as a guide in establishing the annual net benefits gained from the hunter and fisherman's day's use.

Project Maintenance
(Annual Maintenance Cost)

1.	Fence (material)	$ 1,000.00
2.	Wells, including electricity	1,000.00
3.	Brush Treatment (1000 acres)	6,000.00
4.	Road Maintenance	500.00
5.	Ditch Clearing	100.00
6.	Plow & seed (Hansen seeder) 300 acres per year at $10.00/acre	3,000.00
7.	Forestry Aide (8 months)	
	(a) Irrigate plantings	
	(b) Fence Maintenance	
	(c) Follow-up surveys and studies	
	(d) Fire prevention	
	(e) Recreation maintenance and clean-up	
	Labor	4,250.00
	Travel (FOR and mileage)	880.00
8.	Wildlife Biologist	
	Labor (4 months)	4,000.00
	Travel and per diem	1,000.00
9.	Secretary (3 months)	1,500.00
	Total (Sub)	$23,230.00
	Annual Overhead	4,646.00
	TOTAL	$27,876.00

SUMMARY

Development of the Curlew Grassland for multiple use as proposed in this Wildlife Plan will provide benefits of both a concrete and an aesthetic nature. Man, at present, finds himself at a point where his knowledge and his progress seem, at times, to be contradictory. Even when his awareness of the future suggests a pulling back, his current needs demand more and more consumption.

Developing the Grassland can satisfy many elements of public need. It is a solid business investment. Livestock grazing will be improved and increased because of better forage, proper distribution of livestock, summer shade, protection from late fall storms, and the elimination of the need for hauling water. Hunters and fishermen will bring new revenue into the area with their purchase of licenses, fees, and necessary supplies. The general recreation use of the area in total--from the demonstration tours to the campers and picnickers attracted to the unit--will provide a substantial increase in local income. These benefits will actually pay for themselves: careful cost analysis of the project indicates a return of 14.3 percent on the investment, a benefit-to-cost ratio of .989 overall.

The aesthetic value of the project is more difficult to compute. Who can assess the full monetary value of a sage grouse or of a cottontail rabbit?

APPENDIX

Table A-I
HABITAT TYPES

	ACRES									MILES	Acres Miles
	1*	1s**	1f***	2w	2d	3	4	5	6p	6l	
	Crested Wheat Grass	AgCr & Sage Brush	AgCr & 10% Forbs	Wet Meadow	Dry Meadow	Native Sage Brush	Native Browse-Sage	Open Water	Perennial Streams	Inter-mittent Streams	TOTAL
North Unit	2076	3325	3344	92	18	3794	7726		12.5		20375
East Unit	4241	4802	498			2035				2.5	11576
South Unit	6662	5680	1933	17	95	993		269	4.5	3.	15649
Total	12979	13807	5775	109	113	6822	7726	269	17.	5.5	47600
Percent	27	29	13	-	-	14	16	1			100

*1
Relatively pure stand of AgCr (Crested Wheatgrass)

**1s
A reseeded field with sagebrush invasion but less than 10% forbs present

***1f
A reseeded area with or without sagebrush but having 10% or more of forbs present

Wildlife Species on the Curlew National Grassland

Birds

1. Hungarian Partridge
2. Nighthawk
3. Short-Eared Owl
4. Empidonax Flycatcher
5. Brewer's Blackbird
6. Red-Winged Blackbird
7. Yellow-Headed Blackbird
8. Killdeer
9. Mourning Dove*
10. Starling
11. Magpie
12. Meadowlark*
13. Sparrow Hawk
14. American Coot
15. Robin
16. Western Kingbird
17. English Sparrow
18. Ring-Necked Pheasant*
19. Lark Sparrow
20. Sage Thrasher*
21. Vesper Sparrow*
22. Horned Lark
23. Raven
24. Wilson's Phalarope
25. Mallard
26. Sage Grouse*
27. Marsh Hawk
28. Loggerhead Shrike
29. Barn Swallow
30. Bank Swallow
31. Yellow Warbler
32. House Wren*
33. Red-Tail Hawk*
34. Brewer's Sparrow*
35. Bullock's Oriole
36. Pintail
37. Cinnamon Teal*
38. American Widgeon
39. Gadwall
40. Green-Winged Teal*
41. Golden Eagle
42. Sandpiper (Spp.)
43. House Finch
44. Song Sparrow
45. Red-Shafted Flicker
46. Western Tanager
47. Fox Sparrow
48. Green-Tailed Towhee
49. Swainson's Hawk
50. Long-Billed Curlew
51. Burrowing Owl
52. Willet
53. Eared Grebe
54. Western Grebe
55. Snowy Egret
56. American Avocet
57. White Pelican
58. Mountain Bluebird
59. American Goldfinch
60. Redhead
61. Shoveler
62. Great Blue Haron
63. Blue-Winged Teal
64. California Gull
65. Common Snipe
66. Sage Sparrow
67. Rufous-Sided Towhee
68. Chipping Sparrow
69. Sharptail Grouse
70. Lazuli Bunting
71. Whistling Swan
72. Canada Goose
73. Ruddy Duck
74. Prairie Falcon
75. Hooded Merganser
76. Turkey Vulture
77. Cowbird
78. Cliff Swallow
79. Snow Goose
80. Cooper's Hawk
81. Great Horned Owl
82. Lewis' Woodpecker
83. Marsh Wren
84. Ruby Crowned Kinglet
85. Pinyon Jay

*Nest of this species was found

Mammals

1. Mule Deer
2. Coyote
3. Bobcat
4. Badger
5. Skunk
6. Weasel
7. Muskrat
8. Field Mice
9. Cottontail Rabbit
10. Pygmy Rabbit
11. Blacktail Jackrabbit

Reptiles and Amphibians

1. Sagebrush Thrift
2. Rattlesnake
3. Garter Snake
4. Rubber boa
5. Gopher Snake
6. Leopard Frog

Fish

1. Rainbow Trout
2. German Brown Trout
3. Large Mouth Bass
4. Crappie
5. Carp

The following are the priorities for a 3 year period for wildlife developments.

Priority	Field or Project Name	Kind of Treatment		Amount
I	Stone Reservoir	Planting	100 Acres	$ 1,400.00
		Fence	4.5 Miles	5,175.00
		Cattleguards	5	3,500.00
		TOTAL		$10,075.00
II	North Carter	Planting	66 Acres	$ 924.00
		Chisel hard pan	9 Miles	180.00
		Strip, plow & Plant	80 Acres	800.00
		Drill well & supply power	1	23,000.00
		Ditch	8 Miles	200.00
		Fence	5.5 Miles	6,325.00
		TOTAL		$31,429.00
III	Vanderhoff Blow	Strip, plow and plant	102 Acres	$ 1,428.00
		Fence	3 Miles	3,450.00
		Construct Sweeten Pond	1	18,000.00
		TOTAL		$22,878.00

CURLEW NATIONAL GRASSLAND WILDLIFE DEVELOPMENT PLAN

SOUTH UNIT

East Grandine Field

1. Total area improved - 520 acres
2. Habitat treatment - 75 acres
   a. Fence - 1.25 miles
   b. Ditch - 3 miles
   c. Plow and plant - 15 acres
   d. Chisel hard pan - 5 miles
   e. Strip plow and plant - 60 acres

East Hurd Field

1. Total area improved - 645 acres
2. Habitat treatment - 55 acres
   a. Fence - 1.25 miles
   b. Ditch - 5 miles
   c. Plow and plant - 15 acres
   d. Chisel hard pan - 5 miles
   e. Strip plow and plant - 40 acres
3. Information sign - one

West Hurd Field

1. Total area improved - 648 acres
2. Habitat treatment - 60 acres
   a. Fence - 1.75 miles
   b. Plow and plant - 21 acres
   c. Chisel hard pan - 7 miles
   d. Strip plow and plant - 40 acres

Grandine Field

1. Total area improved - 320 acres
2. Habitat treatment - 50 acres
   a. Fence - 1.5 miles
   b. Plow and plant - 18 acres
   c. Chisel hard pan - 6 miles
   d. Strip plow and plant - 30 acres

South Carter Field

1. Total area improved - 510 acres
2. Habitat treatment - 35 acres
   a. Fence - 1.25 miles
   b. Plow and plant - 15 acres
   c. Chisel hard pan - 5 miles
   d. Strip plow and plant - 20 acres

Vanderhoff Field

1. Total area improved - 1,180 acres
2. Habitat treatment - 194 acres
   a. Fence - 5.75 miles
   b. Ditches - 1.5 miles
   c. Plow and plant - 194 acres
   d. Strip plow and plant - 140 acres

East Vanderhoff Field

1. Total area improved - 480 acres
2. Habitat treatment - 9 acres
   a. Fence - 3/4 miles
   b. Plow and plant - 9 acres

Vanderhoff Blow Field

1. Total area improved - 800 acres
2. Habitat treatment - 102 acres
   a. Fence - 3 miles
   b. Plow and plant - 102 acres
   c. Reconstruct Sweeten Pond Dam
3. Water development for livestock

Coop. Spring Field

1. Total area improved - 70 acres
2. Habitat treatment - 40 acres
   a. Fence - $\frac{1}{2}$ mile
   b. Plow and plant - 40 acres

West Grandine Field

1. Total area improved - 400 acres
2. Habitat treatment - 64 acres
    a. Fence - 2 miles
    b. Plow and plant - 24 acres
    c. Chisel hard pan - 8 miles
    d. Strip plow and plant - 40 acres

Grandine Bull Pasture

1. Total area improved - 140 acres
2. Habitat treatment - 12 acres
    a. Fence - 1 mile
    b. Plow and plant - 12 acres
    c. Chisel hard pan - 4 miles
    d. Ponds - 2

West Carter Field

1. Total area improved - 1,040 acres
2. Habitat treatment - 12 acres
    a. Fence - 1 mile
    b. Plow and plant - 12 acres
3. Access Road - 1.5 miles

North Carter Field

1. Total area improved - 1,650 acres
2. Habitat treatment - 146 acres
    a. Fence - 5.5 miles
    b. Ditches - 8 miles
    c. Plow and plant - 66 acres
    d. Chisel hard pan - 9 miles
    e. Strip plow and plant - 80 acres
3. Water Development - Drill well
4. Extend power line to well - 3 miles

Stone Reservoir Project

1. Total area improved - 569 acres
2. Habitat treatment - 100 acres
   a. Fence - 4.5 miles
   b. Plow and plant - 100 acres
3. Construct 5 cattle guards

South 13 Field

1. Total area improved - 1,081 acres
2. Habitat treatment - 104 acres
   a. Fence - 2 miles
   b. Ditches - 9 miles
   c. Plow and plant - 24 acres
   d. Chisel hard pan - 8 miles
   e. Strip plow and plant - 80 acres
   f. Mechanical treatment - 100 acres
   g. Wildlife guzzler - 1

West 13 Field

1. Total area improved - 1,940 acres
2. Habitat treatment - 258 acres
   a. Fence - 4.5 miles
   b. Plow and plant - 84 acres
   c. Chisel hard pan - 8 miles
   d. Strip plow and plant - 80 acres
   e. Wildlife guzzler - 2
3. Construct four cattleguards

North 13 Field

1. Total area improved - 2,526 acres
2. Habitat treatment - 212 acres
   a. Fence - 7 miles
   b. Ditch - 3 miles
   c. Plow and plant - 112 acres
   d. Chisel hard pan - 7 miles
   e. Strip plow - 100 acres
   f. Mechanical treatment - 100 acres
   g. Wildlife guzzler - 1
3. Install cattleguard - one
4. Access Road - 1 3/4 miles

North Canyon Field

1. Total area improved - 640 acres
2. Habitat treatment - 24 acres
   a. Fence - 2 miles
   b. Plow and plant - 12 acres
   c. Wildlife guzzler - 1

Grandine Administrative Site
Headwater Development

1. Total area improved - 1 acre
2. Habitat treatment - 1 acre
   a. Dig out two springs
   b. Clean out reservoir bottom
   c. Move dirt to dam

EAST UNIT

Sheep Creek Bull Pasture

1. Total area improved - 430 acres
2. Habitat treatment - 40 acres
   a. Fence - $\frac{1}{2}$ mile
   b. Plow and plant - 6 acres

East Hess A. Field

1. Total area improved - 600 acres
2. Habitat treatment - 51 acres
   a. Fence - 1.5 miles
   b. Plow and plant - 21 acres
   c. Strip plow and plant - 30 acres

East Hess B. Field

1. Total area improved - 770 acres
2. Habitat treatment - 12 acres
   a. Fence - 1 mile
   b. Ditch - 1 mile
   c. Plow and plant - 12 acres
   d. Wildlife guzzler

South Hess Field

1. Total area improved - 570 acres
2. Habitat treatment - 61 acres
   a. Fence - 1.75 miles
   b. Ditch - 2 miles
   c. Plow and plant - 21 acres
   d. Strip plow and plant - 40 acres

South Hess-Haws Field

1. Total area improved - 720 acres
2. Habitat treatment - 126 acres
   a. Fence - 4 miles
   b. Ditch - 1 mile
   c. Plow and plant - 76 acres
   d. Strip plow and plant - 50 acres
   e. Wildlife guzzler - 1

North Hess-Haws Field

1. Total area improved - 1,540 acres
2. Habitat treatment - 138 acres
   a. Fence - 4 miles
   b. Plow and plant - 58 acres
   c. Strip plow and plant - 80 acres
   d. Mechanical treatment - 100 acres
   e. Wildlife guzzler - 2

Richards Bull Pasture

1. Total area improved - 280 acres
2. Habitat treatment - 24 acres
   a. Fence - 2 miles
   b. Plow and plant - 24 acres

East Hunsaker Field

1. Total area improved - 600 acres
2. Habitat treatment - 27 acres
   a. Fence - 2.25 miles
   b. Plow and plant - 27 acres
   c. Wildlife guzzler - 1

West Hunsaker Field

1. Total area improved - 830 acres
2. Habitat treatment - 64 acres
    a. Fence - 2.75 miles
    b. Plow and plant - 60 acres
    c. Wildlife guzzler - 1

East Richards Field

1. Total area improved - 706 acres
2. Habitat treatment - 40 acres
    a. Strip plow - 40 acres

West Richards Field

1. Total area improved - 520 acres
2. Habitat treatment - None planned

North Funk Field

1. Total area improved - 1,450 acres
2. Habitat treatment - 68 acres
    a. Fence - 1.5 miles
    b. Plow and plant - 18 acres
    c. Strip plow and plant - 50 acres
    d. Wildlife guzzler - 1

South Funk Field

1. Total area improved - 1,988 acres
2. Habitat treatment - 65 acres
    a. Fence - 1.25 miles
    b. Plow and plant - 15 acres
    c. Strip plow and plant - 50 acres
    d. Wildlife guzzler - 1

Funk Bull Pasture

1. Total area improved - 132 acres
2. Habitat treatment - 24 acres
    a. Fence - 2 miles
    b. Plow and plant - 24 acres

NORTH UNIT

South Huffman Field

1. Total area improved - 1,216 acres
2. Habitat treatment - 140 acres
   a. Strip plow and plant - 40 acres
3. Water development - 3 ponds

East Huffman Field

1. Total area improved - 1,254 acres
2. Habitat treatment - 360 acres
   a. Strip plow and plant - 60 acres
   b. Rail dead sagebrush - 200 acres
   c. Mechanical treatment - 100 acres

West Huffman Field

1. Total area improved - 1,785 acres
2. Habitat treatment - 60 acres
   a. Strip plow and plant - 60 acres
3. Water development - 3 ponds

Huffman Field

1. Total area improved - 729 acres
2. Habitat treatment - 40 acres
   a. Strip plow and plant - 40 acres
3. Water development - One pond

Salyer Field

1. Total area improved - 1,509 acres
2. Water development - One pond

Strong

1. Total area improved - 1,964 acres
2. Habitat treatment - 60 acres
   a. Strip plow and plant - 60 acres
3. Water development - One pond

BLM Exchange Field

1. Total area improved - 497 acres
2. Habitat treatment - None planned

East Kurtz

1. Total area improved - 2,158 acres
2. Habitat treatment - None planned

North Kurtz Field

1. Total area improved - 1,510 acres
2. Habitat treatment - None planned

Peterson-Lonigan Field

1. Total area improved - 3,963 acres
2. Habitat treatment - 2,000 acres
   a. Control burn or chain - 2,000 acres

East Jacobsen Field

1. Total area improved - 1,164 acres
2. Habitat treatment - 40 acres
   a. Fence - 1 mile
   b. Ditch - 1 mile
   c. Plow and plant - 20 acres
3. Pipeline - 1 mile

West Jacobsen Field

1. Total area improved - 1,683 acres
2. Habitat treatment - 40 acres
   a. Fence - 1 mile
   b. Plow and plant - 20 acres
3. Water development - Drill one well
4. Pipe line - 1 mile
5. Extend power line to well - 1 mile

CURLEW NATIONAL GRASSLAND RANGE DEVELOPMENT PLAN

Development	Unit	Unit Cost	Total Cost	A.U.M. Capacity w/out treatment	A.U.M. Capacity with treatment
East Grandine Field					
1. No construction needed					
East Hurd Field					
1. Revegetate					
a. Chain and seed (forbs)	160 acres	8.00/acre	$1,280.00	80	160
West Hurd Field					
1. No construction needed					
Grandine Field					
1. No construction needed					
West Grandine					
1. No construction needed					
Grandine Bull Pasture					
1. Chain and seed (grass & forbs)	100 acres	10.00/acre	1,000.00	50	100
* Rebuild fence	1 mile	600.00	600.00		
West Carter					
1. Plow and seed	160 acres	8.00/acre	1,280.00	150	300
2. Chaining and seed (forbs)	300 acres	8.00/acre	2,400.00		
North Carter					
1. Chain and seed (forbs)	1300 acres	8.00/acre	10,400.00	650	900
South Carter					
1. Chain and seed (grass & forbs)	200 acres	10.00/acre	2,000.00	60	160
Vanderhoff Field					
1. Chain and seed (grass & forbs)	450 acres	10.00/acre	4,500.00	160	800
2. Chain and seed (forbs)	350 acres	8.00/acre	2,800.00		
East Vanderhoff Field					
1. Chain and seed (forbs)	400 acres	8.00/acre	3,200.00	200	400
* Rebuild fence	1 3/4 mi.	600.00/mi	1,050.00		
Vanderhoff Blow					
1. Chain and seed (grass & forbs)	200 acres	10.00/acre	5,000.00	40	180
2. Chain and seed (forbs)	160 acres	8.00/acre	1,280.00		
* Rebuild fence	1/2 mile	600.00/mi	300.00		

Development	Unit	Unit Cost	Total Cost	A.U.M. Capacity w/out treatment	A.U.M. Capacity with treatment
Coop Spring Field					
1. Fence	3/4 mile	1400.00	1,050.00	0	80
2. Chain and seed (grass & forbs)	77 acres	10.00/acre	770.00		
South 13					
1. Pipeline	1 mile	480.00/mile**	480.00	80	200
2. Water trough	2	400.00/each**	800.00		
West 13					
1. Pipeline	1½ miles	480.00/mile**	720.00	170	350
2. Water trough	2	400.00/each**	800.00		
North 13 Field					
1. Pipeline	1½ mile	480.00/mile**	720.00	90	320
2. Water trough	2	400.00/each**	800.00		
North Canyon					
1. Pipeline	2 miles	480.00/mile**	960.00	100	320
2. Water trough	1	400.00/each**	400.00		
EAST UNIT					
Sheep Creek Bull Pasture					
1. Chain and seed (grass & forbs)	300 acres	10.00/acre	3,000.00	100	220
East Hess A					
1. Chain and seed (forbs)	600 acres	8.00/acre	4,800.00	80	400
2. Water trough	1	700.00	700.00		
East Hess B					
1. Water trough	1	700.00	700.00		
South Hess Field					
1. Water trough	1	700.00	700.00	50	200
2. Chain and seed (forbs)	500 acres	8.00/acre	4,000.00		
South Hess Haws					
1. Water trough	1	700.00	700.00		
* Rebuild fence	1 3/4 mi.	600.00/mi.	1,050.00		
North Hess Haws					
1. Chain and seed (forbs)	400 acres	8.00/acre	3,200.00	80	400
2. Water trough	1	700.00	700.00		

Development	Unit	Unit Cost	Total Cost	A.U.M. Capacity w/out treatment	A.U.M. Capacity with treatment
Richards Bull Pasture					
1. No construction needed					
East Hunsaker					
1. Chain and seed (forbs)	300 acres	8.00/acre	2,400.00	50	300
2. Chain and seed (grass & forbs)	150 acres	10.00/acre	1,500.00		
3. Water trough	1	700.00	700.00		
* Rebuild fence	½ mile	600.00/mi.	300.00		
West Hunsaker					
1. Chain and seed (forbs)	500 acres	8.00/acre	4,000.00	60	220
2. Water trough	1	700.00	700.00		
East Richards					
1. Chain	300 acres	5.00/acre	1,500.00	40	90
* Rebuild fence	½ mile	600.00/mi	300.00		
West Richards					
1. Chain	200 acres	5.00/acre	1,500.00	50	150
2. Chain and seed (grass & forbs)	100 acres	10.00/acre	1,000.00		
* Rebuild fence	1¼ miles	600.00/mi	750.00		
North Funk					
1. Chain and seed (grass & forbs)	200 acres	10.00/acre	2,000.00	300	920
2. Pipeline	½ mile	480.00/mi	240.00		
3. Water trough	1	400.00 (materials)**	400.00		
4. Chain and seed (forbs)	1000 acres	8.00/acre	8,000.00		
South Funk					
1. Chain and seed (forbs)	1600 acres	8.00/acre	12,800.00	300	1200
2. Pipeline	1½ miles	480.00/mi.	720.00		
3. Pipeline (steel)	½ mile	1600.00/mi.	800.00		
4. Water trough	1	400.00 (materials)**	400.00		
Funk Bull Pasture					
1. No construction needed					

Development	Unit	Unit Cost	Total Cost	A.U.M. Capacity w/out treatment	A.U.M. Capacity with treatment
NORTH UNIT					
South Huffman					
1. Chain and seed (grass & forbs)	600 acres	10.00/acre	6,000.00	150	600
East Huffman					
1. No construction needed					
West Huffman					
1. Pipeline	2 miles	480.00/mi.	960.00		
2. Water trough	2	400.00 (materials)**	800.00		
Huffman					
1. No construction needed					
Salyer					
1. Chain	600 acres	5.00/acre	3,000.00	140	350
2. Chain and seed (grass & forbs)	100 acres	10.00/acre	1,000.00		
Strong					
1. Chain and seed (forbs)	500 acres	8.00/acre	4,000.00	110	250
2. Construct fence	2 miles	1400.00 mi.	2,800.00		
* Rebuild fence	1½ miles	600.00/mi	900.00		
BLM Exchange					
1. Construct fence	1½ miles	1400.00/mi.	2,100.00		
East Kurtz					
1. Chain and seed (grass & forbs)	1060 acres	10.00/acre	10,600.00	100	750
North Kurtz					
1. Drill well and provide water trough at Bierly Well	1	2700.00	2,700.00		
2. Water trough	1	400.00 (material)**	400.00		

Development	Unit	Unit Cost	Total Cost	A.U.M. Capacity w/out treatment	A.U.M. Capacity with treatment
Peterson-Lonigan					
1. Chain	1000 acres	5.00/acre	5,000.00	300	2000
2. Chain and seed (grass & forbs)	1000 acres	10.00/acre	10,000.00		
3. Pipeline	1½ miles	480.00/mi.	720.00		
4. Water trough	2	400.00 (material)**	800.00		
East Jacobsen					
1. Water trough	1	700.00	700.00	50	140
2. Chain and seed (forbs)	200 acres	8.00/acre	1,600.00		
West Jacobsen					
1. Construct fence	1 mile	1400.00	1,400.00	130	400
2. Chain and seed (forbs)	600 acres	8.00/acre	4,800.00		
		TOTAL	$159,180.00	3920	12,860
		Overhead	31,836.00		
		Total	$191,016.00		12,860
					-3,920
					8,940
					Difference in A.U.M. on treated land

Chain and Seed (Forbs)	$70,960.00
Chain and Seed (Grass and Forbs)	48,370.00
Chain	11,000.00
Fence	7,350.00
Plow and Seed	1,280.00
Water Developments	20,220.00
Total Initial Cost	159,180.00
Overhead Assessment	31,836.00
TOTAL FUND REQUIREMENT	$191,016.00

*Permittees will furnish labor for fence reconstruction. Dollars for reconstruction of fences are not included in the development plan totals but are reflected in the annual maintenance cost.

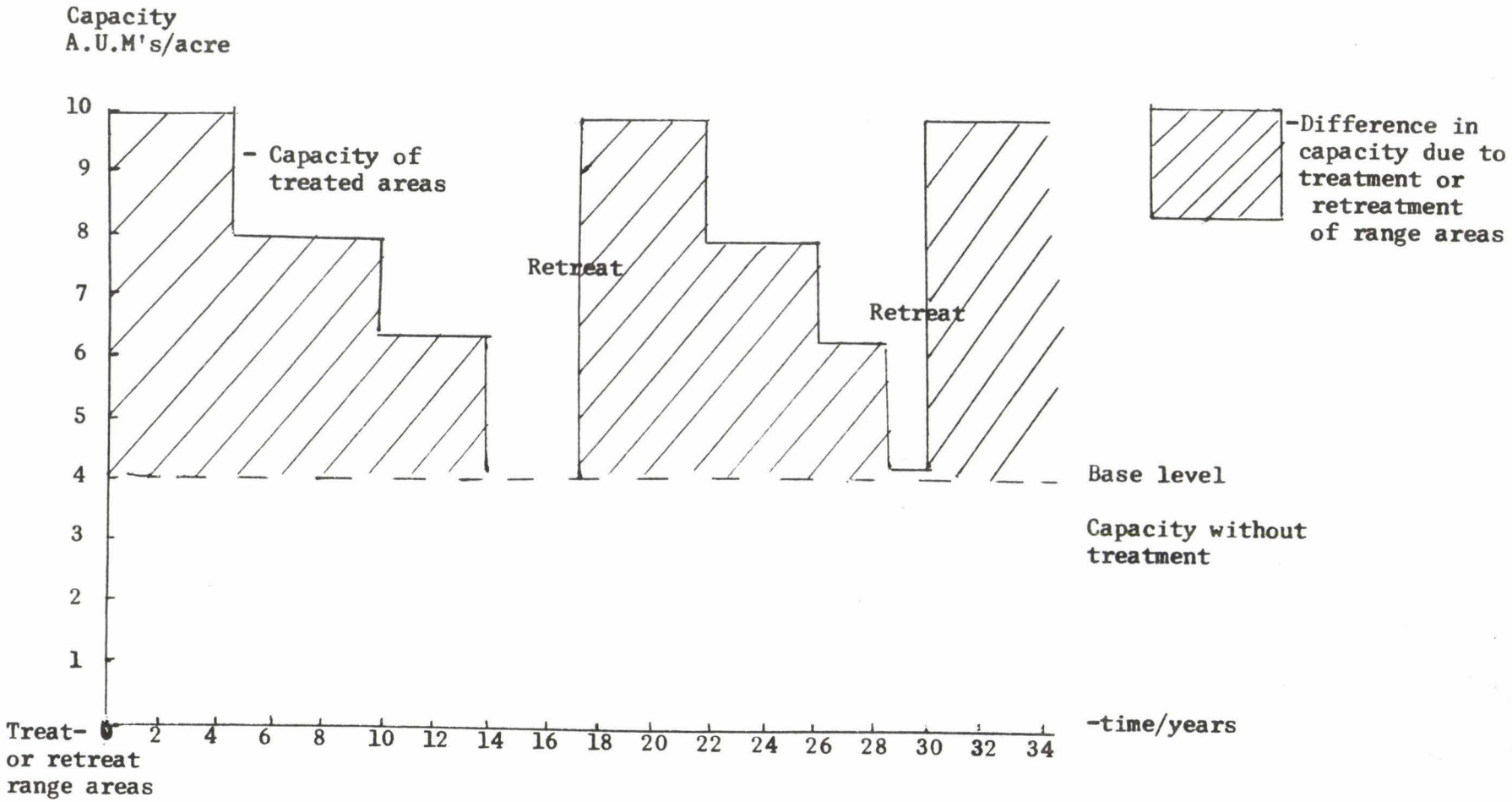
**Cooperative project between Forest Service and Permittees. Forest Service will furnish materials and permittees will furnish labor.

Increases in capacity for the maintenance, development and replacement plans are based on the concept shown in table III. Capacity of an area without the proposed activity represents a base level of production. Capacity with the proposed activity is the highest level of production which can be attained. Due to reinvasion of brush and deterioration of introduced grass stands, a portion of the area should be retreated each year to maintain grazing capacity at an optimum level.

Increases shown in the replacement and maintenance plans cannot be added to the current capacity of the area since several fields are currently producing above the base level at present.

The present capacity is 22,000 and the capacity after implementation of developments program is approximately 30,000.

TABLE III


Capacity
A.U.M's/acre
10
9
8
7
6
5
4
3
2
1
- Capacity of treated areas
Retreat
Retreat
-Difference in capacity due to treatment or retreatment of range areas
Base level
Capacity without treatment
Treat- or retreat range areas
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
-time/years

Range Project Maintenance (annual maintenance cost)

1.	Fence (materials)	$ 800.00
2.	Brush treatment (1000 acres @6.00/acre)	6,000.00
3.	Labor for improvement maintenance	800.00
4.	Travel (F.O.R., mileage and per diem)	100.00
	TOTAL	$7,700.00

RANGE ECONOMIC ANALYSIS

Economic Analysis of Proposed Range Developments

A. Brush Control, Seeding and Fencing

Benefits:

Added AUM's of Grazing	=	6,000/year
6,000 x $4.53	=	$ 27,180/year
$27,180/year for 25 years after 5 years development period	=	$ 153,186
Seed harvested - 60,000 lbs @$.35	=	$ 21,000/yr.
$21,000 x 9.427	=	197,967
Total Benefits	=	$ 351,153

Costs:

Initial Development and Reconstruction	=	152,610
Present worth of maintenance costs of $7,700/year, $7,700 x 9.077 x .621	=	43,403
Total Cost		196,013

Benefit - Cost Ratio = 1.8

Rate of Return = $\frac{\$48,180 - 7,700}{\$196,013}$ = 20.7%/year

B. Water Developments

Benefits:

Cost savings resulting from

elimination of need to haul water = $8,787/year

$8,787/year x 9.427 = $ 82,835

Increased AUM's

4750 @ $4.53 = $21,517

$21,517/year x 9.427 = $ 202,840

TOTAL $ 285,675

Costs:

Development Costs = $ 20,220

Maintenance -$1000/year x 9.427 = $ 9.427

TOTAL $ 29,647

Benefit-Cost Ratio = 9.64

Rate of Return = $\frac{\$30,304 - 1000}{\$20,220}$ = 145%/year

SUMMARY OF I&E RESPONSE

Plan Presentation:

The public was made aware of the Wildlife Plan soon after the idea was conceived. A formal slide lecture was prepared showing the proposals and was presented to the following groups:

Chamber of Commerce
Technical Action Panel
RC&D Committee
5 Livestock Associations
Fish and Game-Forest Service Interagency Meeting

Many informal individual contacts have been made.

Reaction to Plan:

The majority of the people contacted were very receptive to the proposal. Many felt the improvements would add a great deal to the community. Some livestock men felt that the developments would encourage too many people into the area and would hamper their livestock operation. They also were concerned that people would infringe on their private land. The large majority of the stockmen were in favor of the proposal, however.

Plan Implementation:

There will be a considerable time lag in implementing the plan. If and when money is allocated the public will have to be informed again and this can be done in the same manner as was originally used. The livestock people should be contacted and recommendation received from them concerning the present priorities.

STAGE I

MULTIPLE USE SURVEY REPORT

CURLEW NATIONAL GRASSLAND WILDLIFE DEVELOPMENT PLAN

Malad Ranger District Caribou National Forest Region 4

Report Prepared by _____ Date _____
District Ranger

Report Approved by _____ Date _____
Forest Supervisor

INTRODUCTION AND DESCRIPTION

The purpose of the project is to improve the wildlife habitat on the Curlew National Grassland. There are approximately 47,600 acres of National Forest system lands, of this 47,440 acres are located in Oneida County, Idaho and 160 acres in Power County, Idaho. The project is located in the Lower, Travel, and Water influence zones.

Studies conducted have shown the relationship and interspersion of food and cover types and the proportion of each to be limiting factors on the wildlife population. A rather definite pattern of water, food and cover type must exist before land can produce the optimum numbers of wildlife.

It is the intent of this project to increase the wildlife habitat and thus the numbers of wildlife by recognizing the limiting factors on wildlife population and removing them. Based on the inventory and studies, the project was developed for areas where wildlife species are presently found and known habitat requirements are lacking or exist in extremely limited amounts. The treatment includes fencing critical wildlife areas, planting trees and shrubs, plowing strips in

monotypic crested wheatgrass, prescribed burning, chemical and mechanical treatment of sagebrush, and water development.

The Chief's direction states that the National Grassland will be managed for Multiple Use. The following is an excerpt from Deputy Watts' memorandum of November 2, 1966, adding further emphasis on Multiple Use management for the National Grassland: "The basis for establishment of the National Grassland was to develop a program of land conservation and land utilization in order thereby to correct maladjustments in land use. The potential exists on the Curlew National Grassland to develop a real demonstration of Multiple Use management."

The Curlew National Grassland is a Multiple Use area, managed for grazing, wildlife, recreation and watershed.

All resource uses and activities will benefit as a result of this project.

RECOMMENDATION (ALL UNITS)

1. Approve the project.

2. Expand the recreation facility at Curlew Campground, as necessary. (Ranger)

3. Provide sanitation facilities, maintenance, cleanup, and supervision for high use recreation areas. (Ranger)

4. Provide for yearlong parking and sanitation on each side of Stone Reservoir. (Recreation Staff)

5. During hunting season graze cattle in areas of least hunting pressure. (Ranger)

6. Close fields containing cattle to hunting on heavy use days. (Ranger)

7. Protect plantings, controlled burns and other land treatment areas until the vegetation is established. (Ranger)

8. Provide for public access, through fenced areas, where needed.

9. Graze fenced areas with livestock after the wildlife plantings and seedings are established. (Ranger)

10. Construct habitat fences parallel to existing management fences where possible. (Ranger)

11. Provide water gaps for livestock when constructing wildlife improvements. (Ranger)

12. Provide for livestock passage through habitat protection fences. (Ranger)

13. Install cattleguards on access road on west side of Stone Reservoir. (Ranger)

14. Avoid livestock concentrations around Stone Reservoir and Deep Creek. (Ranger)

15. Do not graze Deep Creek during time reservoir is at low water level. (Ranger)

16. Provide for livestock use of water developed for wildlife. (Ranger)

17. Construct aesthetically acceptable fence. (Landscape Architect)

18. Design plantings to provide optimum aesthetic values. (Landscape Architect)

19. Plant vegetation for wildlife habitat that will be compatible with adjacent private land. (Ranger)

20. Provide necessary public access, signs, and information services. (Landscape Architect)

21. Provide maximum safety to adjoining private land in burning and spraying operations. (Ranger)

22. Adequately revegetate burned land for optimum wildlife, livestock, watershed and aesthetic needs. (Ranger)

23. Reduce air pollution as a result of burning, to a minimum. (Ranger)

24. Burn when wind is not blowing in the direction of Highway 37. (Ranger)

25. Insure that livestock and big game are not in or adjacent to burned area. (Ranger)

26. Reseed and drain firelines. (Ranger)

27. Protect historic features of Hudspeth Cutoff Trail. (Ranger)

28. Reduce fire hazard and risk. (Ranger)

29. Provide adequate access roads to Stone Reservoir. (Forest Engineer)

30. Control use of existing roads adjacent to Stone Reservoir. (Ranger)

31. Provide trail access around Stone Reservoir. (Forest Engineer)

32. Provide adequate parking and sanitation facilities around Stone Reservoir. (Forest Engineer)

33. Route new roads around high forage producing areas. (Forest Engineer)

34. Construct parking and sanitation facilities within fenced areas around Stone Reservoir. (Forest Engineer)

35. Locate work camps and park equipment in areas of low fire hazard and where they will not create a conflict with aesthetics, recreation and grazing uses. (Ranger)

36. Provide adequate sanitation facilities in all work camps. (Ranger)

37. Prevent pollution of streams, wells, and springs. (Ranger)

38. Permit borrow areas, sand and gravel pits only when they are compatible with aesthetics, safety, erosion control, wildlife needs, and grazing use. (Ranger)

39. Protect land survey corners and monuments. (Ranger)

40. Revegetate cuts and fills concurrently with construction. (Forest Engineer)

41. Minimize detraction to aesthetic values in location and construction of power lines. (Landscape Architect)

42. Establish no refuse or garbage dump in travel or water influence zones. (Ranger)

43. Assure safety for property, people, and watershed in installation of the water storage dam. (Forest Engineer)

EVALUATION

The project will greatly increase the wildlife populations, thus resulting in increased recreation use. The Curlew Campground is used to capacity at present. The Curlew Campground and Twin Spring Campground will be over taxed if additional recreation areas are not provided. The increased recreation use will require more maintenance and cleanup. The influx of people will require supervision to insure that they comply with Forest Service regulations. The recreation use pattern will change from a basically summer oriented fishing and camping use to a yearlong use. The greatest amount of recreation use will be in the south unit and this unit is used for spring-fall pasture. Peak hunting use will be in the fall. Many people will visit the fenced areas and maintenance cost will increase if access is not provided.

Important treatment features will be of interest to the visiting public and features should be interpreted for the public.

The project calls for "wind break" type plantings along fence rows and a controlled burn to improve range for wildlife. If these areas are not

protected from livestock for a short time the desired effect will be lost.

Approximately 1300 acres of land will be temporarily lost from grazing for approximately 2 years, however, approximately 4000 additional acres will be opened up through development of water.

Approximately 73 miles of fence will be required to implement this program. Part of the fences are along water, and part will parallel existing unit fences. Proposed fences will cross access roads and in some cases cut through existing management units. If gates, cattleguards and water gaps are not provided, livestock management and movement will be impaired.

Livestock concentrate around Stone Reservoir and Deep Creek. This causes water contamination. The water in Stone Reservoir is annually drawn down for irrigation to the point that the water is marginal trout habitat. If cattle graze the head waters during the late summer the water is muddied and further impairs the fish habitat.

Water is limited on the Grassland and is one of the limiting factors influencing wildlife populations. Water will be developed as part of this

project. Livestock will use part of this water.

Large areas are void of trees and shrubs. The project will add greatly to the aesthetics of the area if plantings are laid out properly. Many of the planting sites are near or adjacent to private farm land. Seed could spread to private land and if plants are used that are objectionable to private land owners, adverse public reaction could develop. Due to the close proximity to private land, the public will have a tendency to cross private land. If the public is not controlled, adjoining land owners will suffer damage to crops and ranch facilities.

Studies in Curlew Valley show that sharp-tail grouse inhabit burned areas with good stands of native forbs and grasses. There are 2000 acres of heavy sagebrush that can be burned and converted to suitable habitat for sharp-tail grouse and other wildlife. This burn is proposed for an area that is covered with dense, tall decadent sagebrush. The burn site is located near private land and extreme caution must be taken to insure that the fire is controlled. There is a slight possibility that sufficient vegetation may not come in following the burn. If adequate vegetation does not come in to protect the soil, artificial seeding may be necessary.

Smoke from the prescribed burn will cause some air pollution. There are very few other items that contribute to air pollution in this area. Smoke may drift across Highway 37 and could result in a safety hazard to motorists. Livestock and big game could be trapped within the burn. Firelines will be needed and scalped areas could erode if not properly seeded and drained. The historic Hudspeth Cutoff Trail is located within the proposed burn.

The development of wells, impoundments, perennial streams, breaking up the cover types and type conversions will lessen fire risk, however, as mentioned earlier in the evaluation, recreation use will increase materially. This increased use will increase the risk of man caused fire. If adequate fire prevention is not done, damage could result from wild fire.

Road access is adequate for all of the project except around Stone Reservoir. As use patterns change, access will have to be altered. Two points are important in regard to access to Stone Reservoir. The existing access meets the needs of today, however, as use increases, the present access system will be too close to wildlife populations and will cause disturbance to wildlife. Trail and road access will be needed in the

future, however, road locations will have to be changed so wildlife is not unduly disturbed.

The general public will not know what is in the area unless information is provided for them. People will congregate at the end of the access roads. If parking and sanitation is not provided, a safety hazard will exist. The parking areas are within grazing units and conflicts will exist if cattle are allowed within parking areas.

Road construction destroys the vegetation, thus reducing the amount of forage for wildlife and livestock.

Work camps, used by contractor crews, Forest crews, etc, if not properly located, can unduly increase fire risk, contribute to pollution problems, impair aesthetic views and interfere with use in developed recreation sites, and disturb livestock.

Equipment storage and accompanying equipment maintenance (such as changing oil and filters) can create pollution and aesthetic problems. Improperly designed borrow pits, sand and gravel pits are not aesthetically acceptable and can create erosion and/or safety hazards.

Land survey corners and monuments, if not located and protected prior to some construction jobs, can be destroyed.

Improper road construction can result in unstable cuts and fills, thus causing damage to the watershed.

Power lines will be required to furnish power to 2 wells. Power lines change the natural setting and if the power lines are not properly located, they will detract from aesthetics.

Garbage and refuse dumps in the Travel and Water Zone adversely affect natural beauty and contribute to pollution problems.

One reservoir with approximate capacity of 160 acre feet is proposed. The area below the dam drains into Stone Reservoir on a grade from 5% to 10%. The drainage crosses one county road and drains through private range land.

All segments of the project will be management units on the Grassland.

Kurts Field

Peterson-Lonigan Field

Lonigan Springs

Hudspeth Cutoff Trail

Twin Spr.

Rock Spr.

West Jacobson Field

East Jacobson Field

West Jacobson

East Jacobson

Peterson-Lonigan Field

Richards Bull Pasture

Sawyer Cow Camp

Sawyer Field

Strong Field

B.L.M. Exchange Field

Horse Pastures

West Richards Field

East Richards Field

North Funk Field

Sheep Creek Bull Pasture

Strong Field

Hess-Haws Field

East Hess

West Huffman Field

East Huffman Field

Strong Horse Pasture

Strong Corral

South Funk Field

West Hunsaker Field

South Hess Haws Field

East Hess

South Huffman Field

Funk Bull Pasture

East Hunsaker Field

South Hess Field

Thompson Bull Pasture

North 13 Field

Vanderhoff Blow Field

West Carter Field

North Canyon Field

Vanderhoff Field

East Vanderhoff Field

South 13 Field

West 13 Field

North Carter Field

West Hurd Field

South Carter Field

East Hurd Field

Grandine Field

East Grandine Field

Grandine Horse Pasture

Grandine Ranger Station

West Grandine

Grandine Bull Pasture

U.S. DEPARTMENT OF AGRICULTURE

FOREST SERVICE

CARIBOU NATIONAL FOREST

CURLEW NATIONAL GRASSLANDS

MULTIPLE-USE PLANNING MAP

MAP

N

Refer to Pages 61 through 77 of the written plan for specific development needs within each field on this map.

9/29/70
F. G. Beitie

R. 31 E. R. 32 E.

R. 32 E. R. 33 E.

R. 33 E. R. 34 E.